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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,905	09/30/2003	Jay W. Dawson	IL-11186	8068

7590 02/10/2005
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EXAMINER

SONG, SARAH U

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,905

Applicant(s)

DAWSON ET AL.

Examiner

Sarah Song

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

2. Claims 8 and 27 are objected to because of the following informalities: Examiner believes that “germinia” should be changed to –germania–. Appropriate correction is required.
3. Claim 13 is objected to because of the following informalities: “said signal pulse” lacks proper antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1-3, 5, 7, 14, 15, 21, 22, 24 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Richardson et al. (U.S. Patent Application Publication 2002/0018630).**
6. Regarding claims 1 and 21, Richardson et al. discloses an optical fiber having at least three distinct, concentric cylindrical regions 22, 24, and 26 having corresponding refractive

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indices of n_1 , n_2 and n_3 and corresponding diameters d_1 , d_2 and d_3 where $n_2 > n_1 > n_3$ and $d_3 > d_2 > d_1$ and at least one of the regions contains an optically active rare earth ion.

7. Regarding claims 2 and 21, Richardson et al. further discloses means for optically pumping said optical fiber (pump 980nm), said apparatus further comprising means L1 for coupling signal light into said optical fiber to be amplified.

8. Regarding claims 3 and 22, the means for optically pumping said optical fiber includes a laser diode or laser diode array. Paragraph [0055].

9. Regarding claims 5 and 24, said optical fiber is further surrounded by a region with refractive index $n_4 < n_3$ to provide a multi-mode waveguide. See Figure 2.

10. Regarding claims 7 and 26, the optically active rare earth ion is selected from one of the following Yb^{3+} , Nd^{3+} , Sm^{3+} , Tm^{3+} , Er^{3+} , Ho^{3+} , Dy^{3+} or Pr^{3+} .

11. Regarding claims 14, Richardson et al. further comprising means M2 for providing feedback to said apparatus.

12. Regarding claim 15, means for providing feedback include at least one mirror M2 configured to reflect a portion of light emitted optical fiber back into said optical fiber.

13. **Claims 1, 8, 21 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Shukunami et al. (U.S. Patent 5,778,129).**

14. Regarding claims 1 and 21, Shukunami et al. discloses an optical fiber having at least three distinct, concentric cylindrical regions 24, 23, and 22 having corresponding refractive indices of n_1 , n_2 and n_3 and corresponding diameters d_1 , d_2 and d_3 where $n_2 > n_1 > n_3$ and $d_3 > d_2 > d_1$ and at least one of the regions contains an optically active rare earth ion.

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15. Regarding claims 8 and 27, said optical fiber comprises fused silica in region 22 and fused silica with germania, phosphorous, fluorine or alumina in regions 24 and 23 (column 6, lines 20-36).

16. **Claims 1 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Inagaki et al. (U.S. Patent 5,799,125).**

17. Regarding claim 1, Inagaki et al. discloses an optical fiber having at least three distinct, concentric cylindrical regions 12, 14 and 16 having corresponding refractive indices of n_1 , n_2 and n_3 and corresponding diameters d_1 , d_2 and d_3 where $n_2 > n_1 > n_3$ and $d_3 > d_2 > d_1$ and at least one of the regions contains an optically active rare earth ion.

18. Regarding claim 11, said rare earth ion is confined to region 12 or a concentrically located sub-region of region 12. See Abstract.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. **Claims 4, 9, 10, 12, 13, 16-20, 23 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson et al.**

21. Regarding claims 4 and 23, Richardson et al. does not expressly disclose wherein n_1 , n_2 and n_3 and d_1 , d_2 and d_3 are chosen to provide a fundamental optical mode at the wavelength of said signal light such that the electric field of said fundamental optical mode at the center of said cylindrical regions is approximately the same strength as the electric field at the outer edge of the

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second region. However, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select appropriate values for n_1 , n_2 and n_3 and d_1 , d_2 and d_3 to provide a fundamental optical mode at the wavelength of said signal light such that the electric field of said fundamental optical mode at the center of said cylindrical regions is approximately the same strength as the electric field at the outer edge of the second region in order to optimize the fiber characteristics.

22. Regarding claims 9 and 10, Richardson et al. does not expressly disclose the claimed values for n_1 , n_2 and n_3 and d_1 , d_2 and d_3 . However, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select appropriate values for n_1 , n_2 and n_3 and d_1 , d_2 and d_3 in order to optimize the fiber characteristics.

23. Regarding claims 12 and 28, Richardson et al. does not expressly disclose the apparatus wherein said fiber is preferentially wound around a cylindrical mandrel of radius R , where R is chosen such that there is minimal bend induced attenuation for the desired waveguide mode propagating in the core of the fiber, but significant attenuation for all other modes at the signal wavelength. However, it is well known in the art to wind an optical fiber amplifier around a mandrel to attenuate undesired modes. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05. Therefore, it would have been obvious to one having ordinary skill in the art to

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preferentially wind the fiber around a mandrel of radius R in order to optimize coupling and transmission characteristics of the fiber.

24. Regarding claims 13 and 16-20, Richardson et al. does not expressly disclose an ultra-short signal pulse and a means for temporally stretching the signal pulse, wherein the stretched pulse is greater than 10 times longer in time than the signal pulse, an optical isolator, a Q-switch, polarizers, a parallel grating pair, or a non-linear crystal. Ultra-short pulses, means for stretching signal pulses, optical isolators, Q-switches, polarizers, parallel grating pairs and non-linear crystals are well known in the art. One of ordinary skill in the art would have found it obvious to provide the claimed features since applicant has not disclosed any criticality for the claimed features.

25. **Claims 6 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson et al. as applied to claim 1 or 21 as applicable above, and further in view of Po (U.S. Patent Application Publication 2004/0156606).**

26. Regarding claims 6 and 25, Richardson et al. does not expressly disclose the cylindrical symmetry of the third region to be deliberately broken via de-centering of the region from the other regions or by altering the outside shape of the region.

27. Po discloses an optical fiber laser/amplifier wherein the cylindrical symmetry of the third region to be deliberately broken via de-centering of the region from the other regions.

28. Richardson et al. and Po are analogous art as pertaining to fiber amplifiers.

29. It would have been obvious to one having ordinary skill in the art at the time the invention was made to deliberately break the asymmetry in order to optimize pump characteristics of the fiber as taught by Po. See Paragraph [0067].

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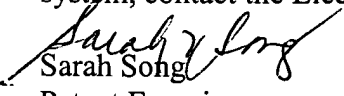
Conclusion

30. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Song whose telephone number is 571-272-2359. The examiner can normally be reached on M-Th 7:30am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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